

# Electrical operating instructions



## Door Control Panel TS 970 Software 3.3

(Design and functions subject to change)

51171271 / 12.2005



# OPERATING INSTRUCTIONS

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# SAFETY DIRECTIONS

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## Basic Directions

This control has been built in accordance with **DIN EN 12453 Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements and DIN EN 12978 Industrial, commercial and garage doors and gates - Safety devices for power operated doors - Requirements and Test methods**; and left the factory in perfect condition from the point of view of safety. To maintain this condition and to ensure safe operation, the user must observe all the directions and warnings contained in these operating instructions.

In principle, only trained electrical craftsmen should work on electrical equipment. They must assess the work which has been assigned to them, identify potential danger sources and take suitable safety precautions.

Reconstruction of or changes to TS 970 are only permissible with the approval of the manufacturer. Original replacement parts and accessories authorised by the manufacturer guarantee safety. Liability ceases to apply if other parts are used.

The operational safety of an TS 970 is only guaranteed if it is used in accordance with the regulations. The limiting values stated in the technical data should not be exceeded under any circumstances (see corresponding sections of the operating instructions).

## Safety Regulations

During the installation, initial operation, maintenance and testing of the Control Panel, it is necessary to observe the safety and accident-prevention regulations valid for the specific application.

In particular, you should observe the following regulations (this list is not exhaustive):

European normative

- DIN EN 12445  
Safety in use of power operated doors - Test methods
- DIN EN 12453  
Safety in use of power operated doors - Requirements
- DIN EN 12978  
Industrial, commercial and garage doors and gates -  
Safety devices for power operated doors - Requirements and Test methods

Please check normative's bellow.

VDE-regulations

- DIN EN 418  
Safety machinery  
Emergency stop equipment functional aspects  
Principles for design
- DIN EN 60204-1 / VDE 0113-1  
Safety of machinery - Electrical equipment of machines - Part 1:  
Prescriptions générales
- DIN EN 60335-1 / VDE 0700-1  
Safety of household and similar electrical appliances - Part 1:  
General requirements



Regulations

- Please ensure that the local regulations relating to the Safety of Operations of Doors are followed

# SAFETY DIRECTIONS

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## Explanation of warnings

These operating instructions contain directions which are important for using the ELEKTROMATEN® appropriately and safely.

The individual directions have the following meaning:



### **DANGER**

This indicates danger to the life and health of the user if the appropriate precautions are not taken.



### **CAUTION**

This warns that the ELEKTROMATEN® or other materials may be damaged if the appropriate precautions are not taken.

## General warnings and safety precautions

The following warnings are to be understood as a general guideline for working with the ELEKTROMATEN® in conjunction with other devices. These directions must be observed strictly during installation and operation.



Check that all screw connections are secure before operating the control and adjusting the limit switches.



- Please observe the safety and accident prevention regulations valid for the specific application.
- The ELEKTROMATEN® must be installed with the authorised coverings and protective devices. Care should be taken that any seals are fitted correctly and screw couplings are tightened correctly.
- In the case of ELEKTROMATEN® with a permanent mains connection, an all-pole main switch with appropriate back-up fuse must be provided.
- Check live cables and conductors regularly for insulation faults or breakages. When a fault is detected in the cabling, the defective cabling should be replaced after immediately switching off the mains supply.
- Before starting operation, check whether the permissible mains voltage range of the devices corresponds to the local mains voltage.
- With three – phase motor connection it must have right phase rotation

# INSTALLATION ADVICE

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After the ELEKTROMATEN® is fitted we recommend the following procedure to rapidly reach a fully functioning door.

- |                |  |         |
|----------------|--|---------|
| • Installation | <b>Enclosure installation</b>          | page 8  |
| • Installation | <b>Wiring the Drive to the Control</b> | page 8  |
| • Check        | <b>Mains supply</b>                    | page 9  |
| • Check        | <b>Phase rotation</b>                  | page 10 |
| • Programming  | <b>Rapid limit adjustment</b>          | page 11 |

**The door is ready to work in Dead man mode.**

- |                |                       |             |
|----------------|-----------------------|-------------|
| • Installation | <b>Safety devices</b> | page 13, 19 |
| • Programming  | <b>Door functions</b> | page 14     |

**The door is ready to work in automatic mode.**

Check connection of external devices e.g. push button etc.

Overview to connect external devices see diagram (page 13).

After the devices are connected the programming of the control panel must be finalised. (page 14).

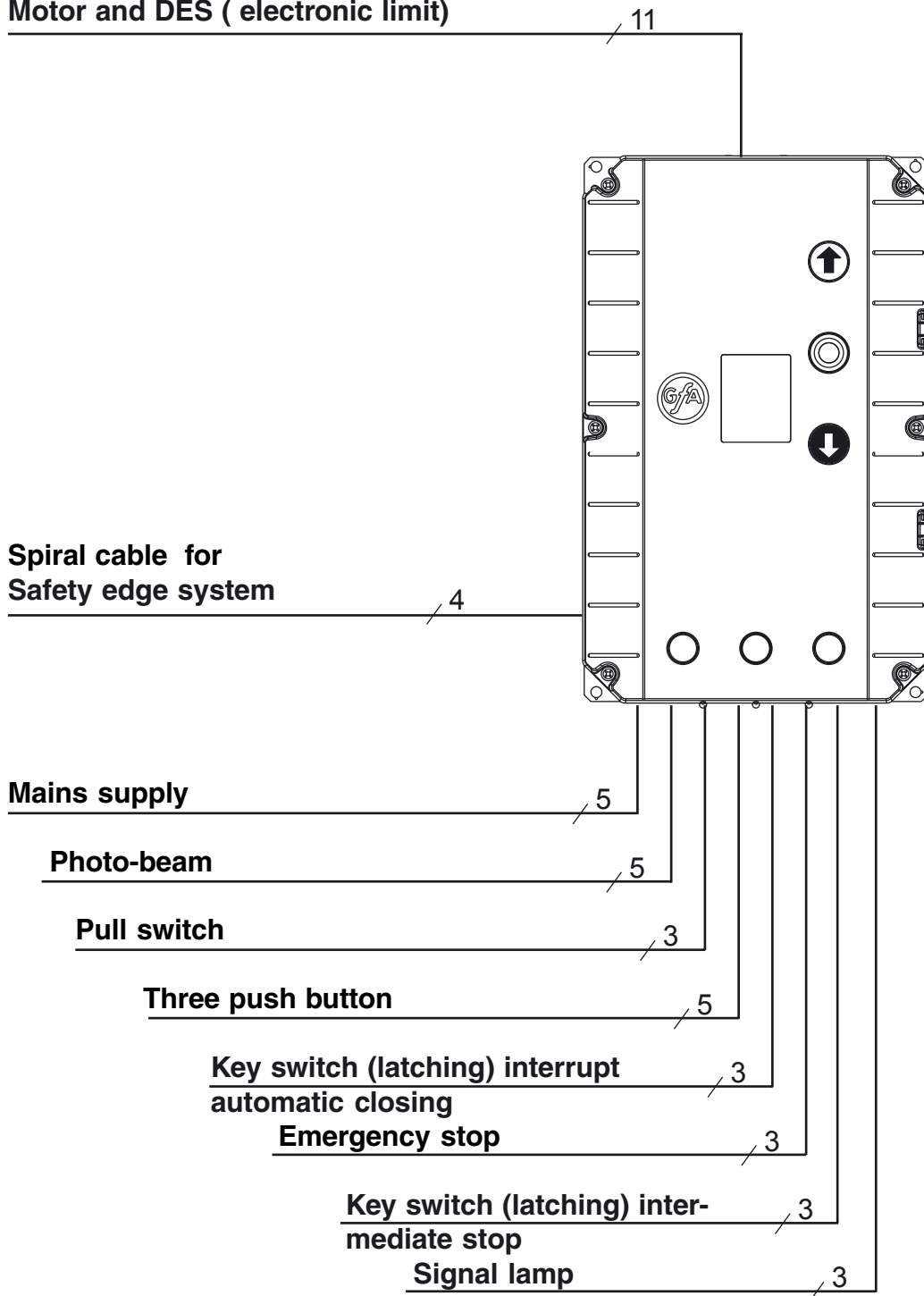
# INSTALLATION OVERVIEW



## Important!

Using the connection cable out side the building is not permitted.

**Connection cable ELEKTROMAT® for  
Motor and DES ( electronic limit)**



—/( ) Number of cores in the cable

# ENCLOSURE INSTALLATION

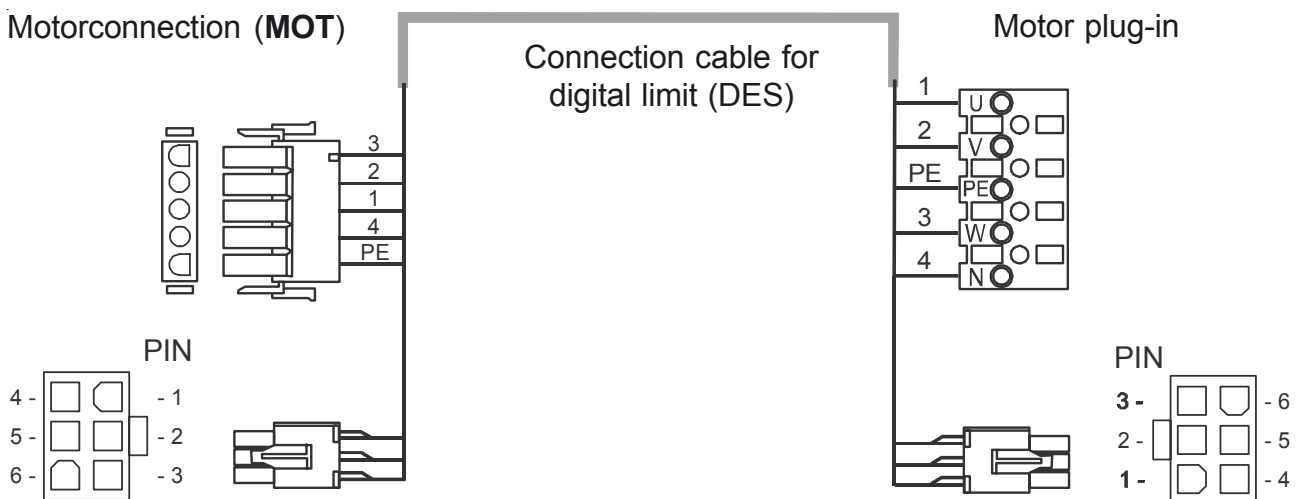
Before mounting the enclosure, the surface has to be checked for flatness, slope and freedom from vibrations. Mounting must be vertical. It is important that the door can be clearly seen from the position of the control through-out its travel.

## CONNECTING THE CONTROL AND THE ELEKTROMATEN®

After the drive and control are fitted they can be connected with a plug-in cable. The cable has plugs on each end and for easy fitting. The plugs for motor and control panel are different and cannot be interchanged.

Control panel TS 970

Motorconnection (**MOT**)



### Cable identification

Motor plug to control unit

PIN	- Wire-No.	Excution:
1	- 3	Phase W
2	- 2	Phase V
3	- 1	Phase U
4	- 4	Neutral (N) (not used)
5	- PE	Earth

Limit plug-in to control panel TS 970 (**DES**)

PIN	- Wire-No.	Excution:
1	- 5	Safety chain 24V DC
2	- 6	RS485 B
3	- 7	GND
4	- 8	RS485 A
5	- 9	Safety chain
6	- 10	8V DC



# MAINS SUPPLY

The CONTROL PANEL TS 970 has a universal electric supply and works with the following supplies. (See diagram Fig.1-5)



## Important note!

The bridge must be fitted into the right terminal otherwise the print could be destroyed.



## External fuse!

External fuse in the main supply should be max. 10A delayed.

The supply disconnect device (Main switch or CEE plug) must be installed between 0,6m and 1,7m above floor level.



## DANGER! To the life and health thru electric shock.

Before mounting the mains supply must be switched OFF.

With terminal 1.5, 1.6 und 1.7 the mains supply input can be selected.

For 400V – mains supply the bridge 1.5 to 1.6 must be fitted

For 230V - mains supply the bridge 1.6 to 1.7 must be fitted.

## Mains supply terminal

Fig.: 1

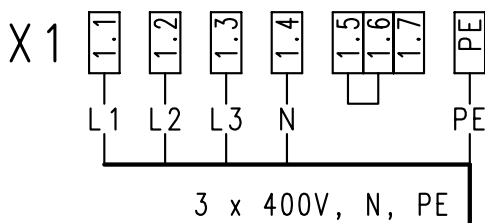


Fig.: 4

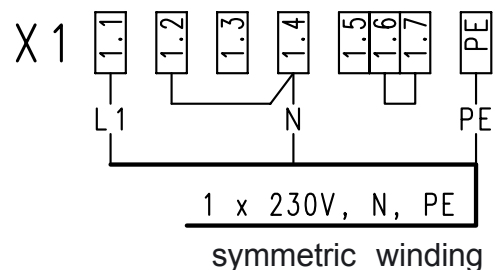


Fig.: 2

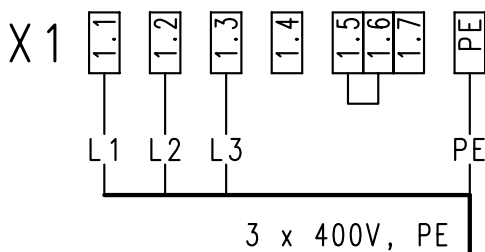


Fig.: 5

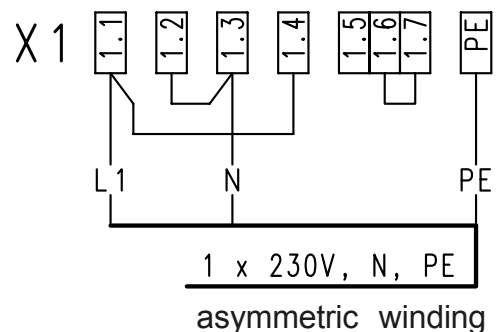
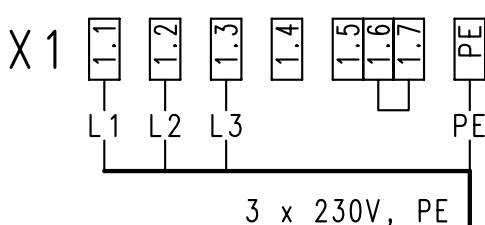


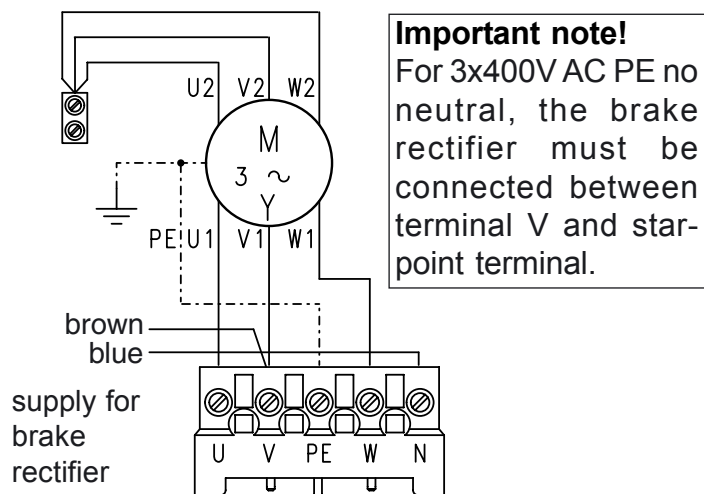
Fig.: 3



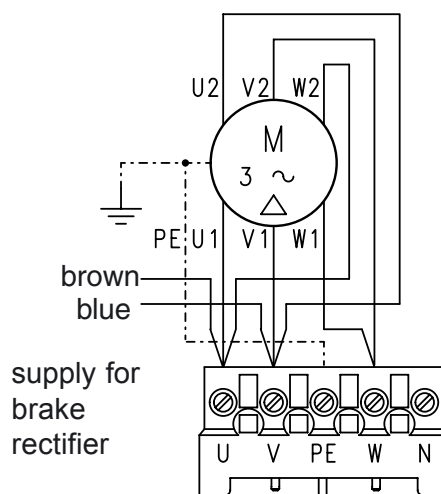
Drive unit with DU speed controller works only with 3x 400V. A supply 3x230V or 1x 230V is not allowed

# MOTOR CONNECTION (internal wiring)

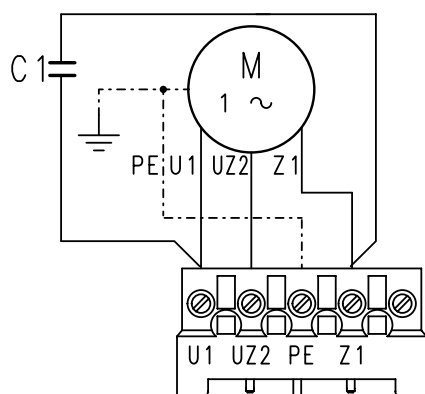
Three-phase 3 x400 V AC, N, PE  
**Star connection**



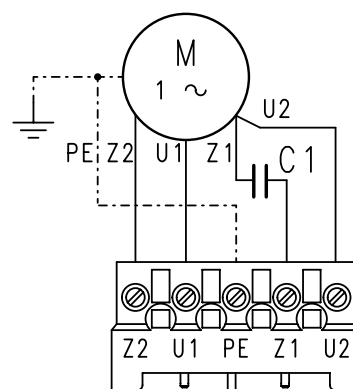
Three-phase 3 x230 V AC, N, PE  
**Delta connection**



Single-phase 1x230 V AC, N, PE  
**symmetrical winding**



Single-phase 1x230 V AC, N, PE  
**asymmetrical winding**



On several ELEKTROMATEN® the connection U1 und V1 on the motor-plug are interchanged.

## PHASE ROTATION



### Important Notice!

After the Mains supply has been connected by inserting the CEE plug in the appropriate socket or turning on the main switch, confirm that the phase rotation is correct by checking that the door opens when the OPEN push button is operated.

If the door closes when operating the OPEN push button reverse two phases at the terminal X1.



### DANGER! To the life and health through electric shock.

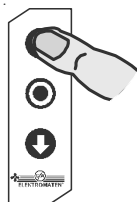
Before changing phase rotation the mains supply must be switched OFF.

# RAPID ADJUSTMENT OF THE LIMITS



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When the phase rotation has been checked the Rapid limit adjustment can be made.  
The final setting can be made with the fine adjustment (Control Programming page 15).  
Safety limits and pre-limits are automatically adjusted.

## 1. Setting final limit open



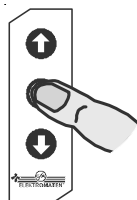
Door open

press button to reach upper limit   




Display  
blinking

## 2. Memorise the final limit open

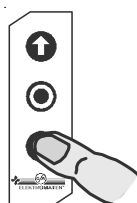


Press stop-button for 3 sec. until  
the display changes





Display  
changes

## 3. Setting the final limit close



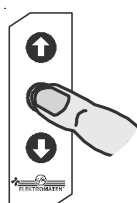
Door close

press button to reach lower limit   


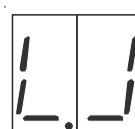


Display  
blinking

## 4. Memorise the final limit close



Press stop-button for 3 sec. until  
the display changes

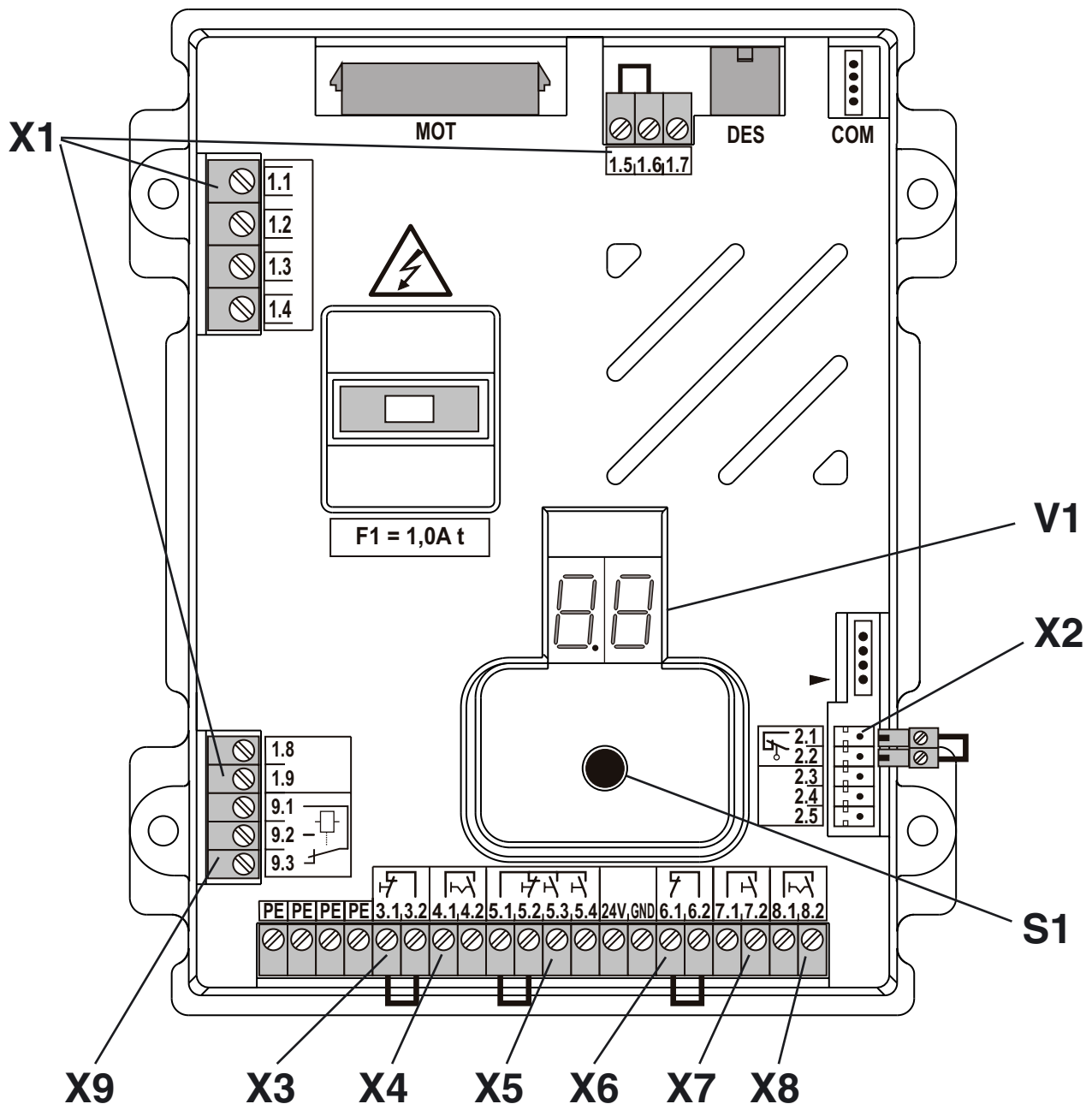


Display  
changes

**The Rapid adjustment is finished**

**The door could be moved in DEADMAN mode UP/DOWN  
Further adjustments see programming mode**

# HARDWARE OVERVIEW



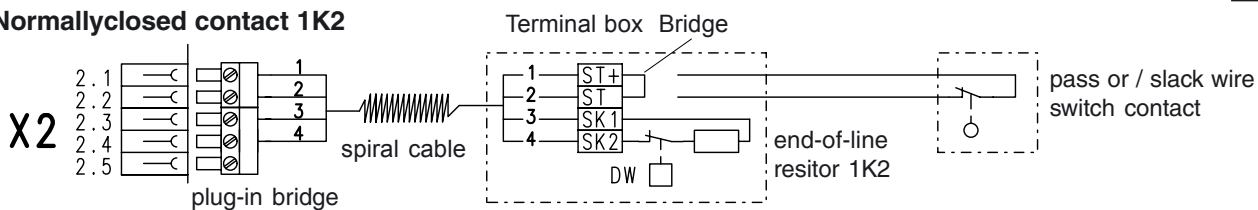
## Description Print:

- X1** Mains supply  
external supply 230V  
**1.9** = L1 fused with F1 = 1A  
**1.8** = N  
(only with 3 x 400V, N, PE und 1 x 230V, N, PE)
- X2** Safety edge system and pass-door plug
- X3** Emergency push-button
- X4** Key switch (latching) interrupt automatic closing
- X5** Three- push button / key switch
- X6** Light barrier reflective or receiver- transmitter type
- X7** Ceiling pull switch / Radio control
- X8** Key switch for intermediate stop
- X9** Potential free relay contact  
warning light or annunciator

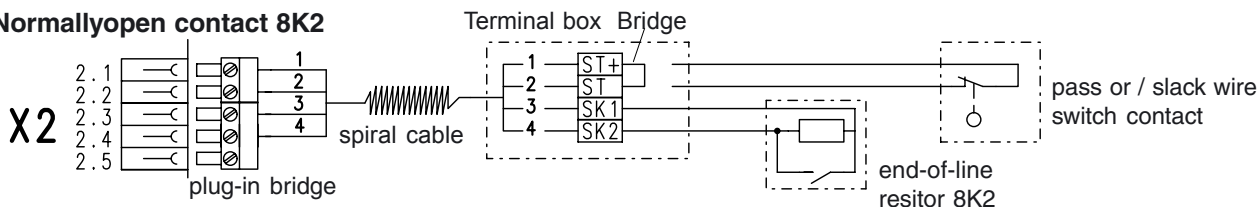
- S1** Selector switch
- V1** 7-segment display
- MOT** Motor connection
- DES** Limit connection
- COM** Interface
- Internal pushbutton

# WIRING DIAGRAM

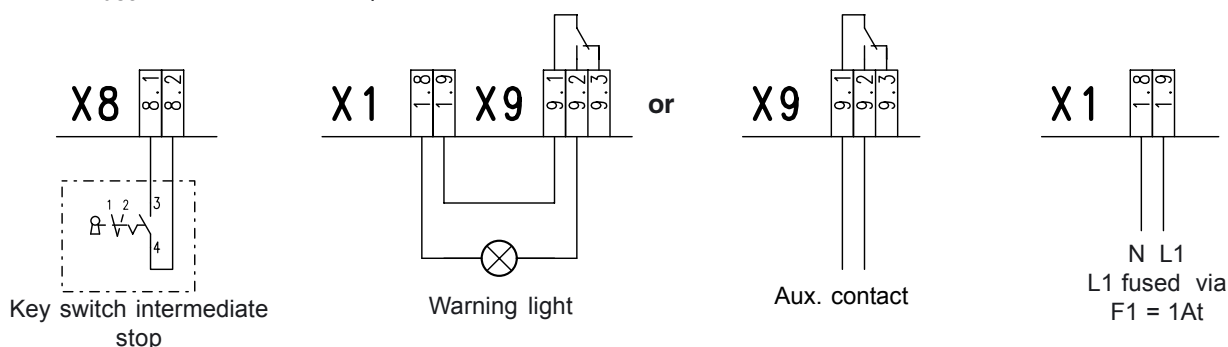
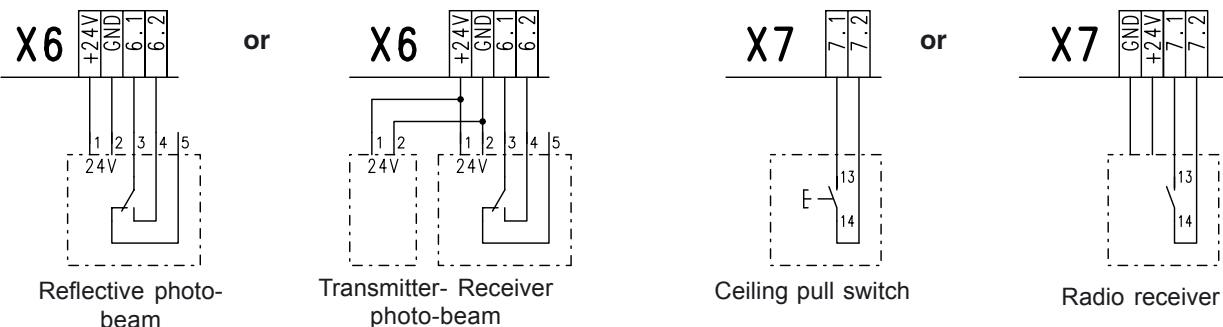
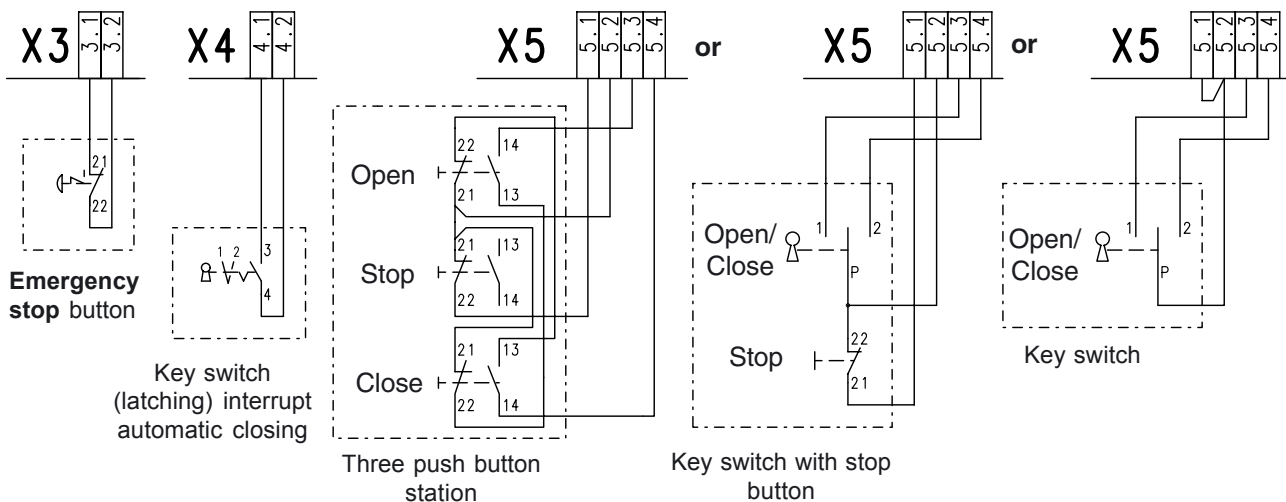
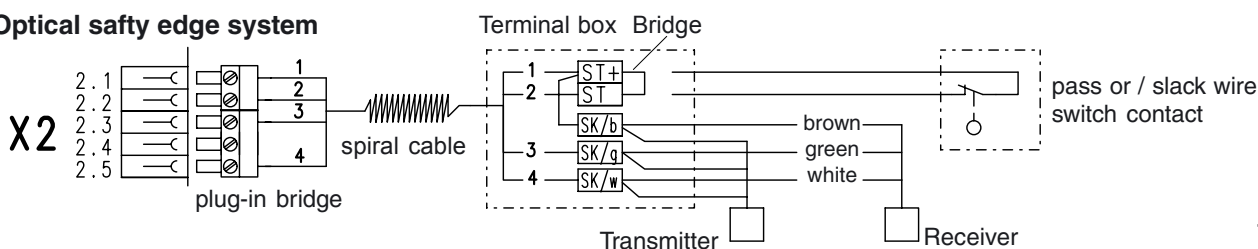
## Normallyclosed contact 1K2



## Normallyopen contact 8K2



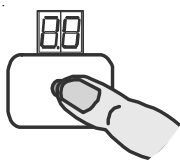
## Optical safty edge system



# CONTROL PROGRAMMING

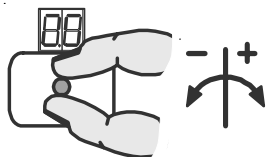
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## 1. Enter programming Mode



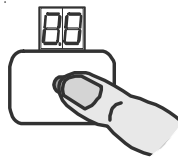
Press selector switch for 3 sec. until **display = 00**

## 2. Chose program and confirm



Turn selector

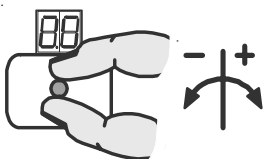
and



Press selector

## 3. Adjustment

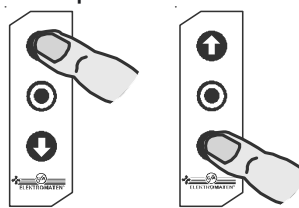
Functionen



Turn selector

or

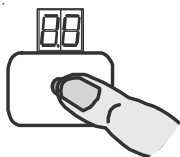
Door position



Press foil buttons

## 4. Memorise

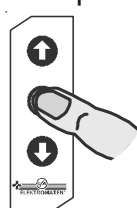
Functionen



Press selector

or

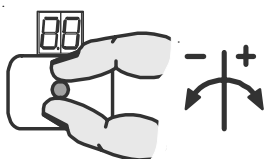
Door position



Press stop-button

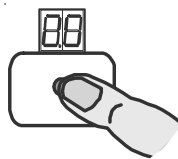
further adjustments

## 5. Exit programming







































Turn selector until display = 00

and




































Press selector

# CONTROL PROGRAMMING

2. Choose program and confirm		3. Adjustment		4. Memorise
Operating mode				
 Door function		 Dead man OPEN  Dead man CLOSE  Self-hold OPEN  Self-hold CLOSE  Self - hold OPEN, CLOSE (X5) release for external pushbutton function only dead man close	 Press selector	
Door position				
 Final limit open coarse adjustment		 Move door upwards or downwards	 Press stop Button	
 Final limit close coarse adjustment		 Move door upwards or downwards	 Press stop Button	
 Final limit open fine adjustment		 Final limit open can change without door movement using +/-	 Press selector	
 Final limit close fine adjustment		 Final limit close can change without door movement using +/-	 Press selector	
 Pre-limit safety edge fine adjustment		 Pre-limit safety edge can change using +/-	 Press selector	
 Intermediate stop		 Move to intermediate stop	 Press stop Button	
 Relay switch position		 Move to relay switch position	 Press stop Button	












See page 11: [Limit switch rapid - Adjustment](#)

# CONTROL PROGRAMMING

















































2. Choose program and confirm	3. Adjustment	4. Memorise
<b>Functions</b>		
 Safety edge function in Pre - limit area	  Safety edge is activated  Safety edge is deactivated  Safety edge is activated + automatic ground adjustment	 Press selector
 Overrun correction	  OFF  ON	 Press selector
 Automatic closing feature	  time can be set between 1 - 240 sec. 0 = OFF	 Press selector
 Automatic closing after photo-beam is interrupted and re-made	  OFF  ON	 Press selector
 Relay function	  OFF  Switch contact impulse signal  Switch contact continuous  Signal lamp starts flashing with 3 sec. pre-warning time when door Open's and Close's  Signal lamp starts flashing with 3 sec. pre-warning time only when door Close's direction	 Press selector
 Step by Step function (X7): only Ceiling pull switch / Radio remote control	  Commands door travels to Open or → Closed position during closing door Stops and re-opens  Commands Open→Stop→Close→Stop→ Open	 Press selector



# CONTROL PROGRAMMING

2. Chose program and confirm	3. Adjustment	4. Set
Safety functions		
 Door overload monitor	  OFF  Coarse monitoring  Fine monitoring	 Press selector
 Photo beam interrupt function	  OFF  ON	 Press selector

# CONTROL PROGRAMMING

2. Choose program and confirm	3. Adjustment	4. Memorise
<b>Adjustment only for ELEKTROMATEN® with speed changer DU</b>		
 OPENING speed	  Output speed OPEN - rpm	 Press selector
 CLOSING speed	  Output speed CLOSE - rpm	 Press selector
 HIGHER CLOSING speed	  Increased closing speed to a height of 2,5m 0=OFF	 Press selector
 Changeover position CLOSING speed	  Changeover position higher/lower closing speed	 Press stop Button
 UPWARD acceleration	  rapid	 Press selector
	  normal	
	  slow	
 DOWNWARD acceleration	  rapid	 Press selector
	  normal	
	  slow	
 UPWARD deceleration	  rapid	 Press selector
	  normal	
	  slow	
 DOWNWARD deceleration	  rapid	 Press selector
	  normal	
	  slow	



The appeared numbers for output speed open and close corresponding to the real RPM of the drive unit.  
The speed has a direct influence into operating forces.  
Check again the adjustment and drive unit's speed.

Programming:











## SE 6.65 DU

P 41 rpm open → min. 20 rpm – max. 65 rpm























P 42 rpm close → min. 20 rpm – max. 30 rpm

P 43 the same as P42






# CONTROL PROGRAMMING

2. Chose program and confirm	3. Adjustment	4. Set
<b>Maintenance cycle counter</b>		
 Counter adjustment	  01-99 correspond from 1.000 up to 99.000 Count down cycles	 Press selector
 Reaction when reaching 0	 <div>  Display appears „CS“ and adjusted number of cycles   Changing to DEADMAN display appears „CS“ and adjusted number of cycles   Changing to DEADMAN same as 0.2 reset to about 500 cycles possible, press 3 sec. Stop – Button             </div>	 Press selector

# MEMORY CHECK

2. Chose program and confirm		Displayed
 Info Cycle counter 7- digit	 Press selector	<div>        </div> <div>M HT ZT T H Z E</div> <p>The cycles would be displayed as follow.</p> <div> M = 1.000.000      H = 100  HT = 100.000      Z = 10  ZT = 10.000      E = 1  T = 1.000 </div>
 Info last 2 faults	 Press selector	<p>Last 2 faults would be alternately displayed.</p>
 Info Program changes 7- digit	 Press selector	<div>        </div> <div>M HT ZT T H Z E</div> <p>The Number of program changes would be displayed as follow.</p> <div> M = 1.000.000      H = 100  HT = 100.000      Z = 10  ZT = 10.000      E = 1  T = 1.000 </div>
 Info Program version	 Press selector	<p>Program version will be displayed</p>

# RESET

2. Chose program and confirm	3. Adjustment	4. Set
 RESET except cycle- and Program change counter	   Reset	 Press stop button 3 sec.

# SAFETY DEVICES

---

## **Safety edge system with optional connection for shutter pass - door or slack wire switch contact. X2**

The control recognizes and works with 3 different safety edges.

Each one needs a special 4 core spiral cable and includes an optional shutter pass - door or slack wire switch contact.

The spiral cable connection must be made on the print with the plug provided. The opposite side of the cable is connected to a terminal box or a signal (pressure switch) emitter.

**Typ 1: Resistance evaluation 1K2 with normally closed safety edge contact**  
(safety edge with pressure wave switch and "Testing")

**Typ 2: Resistance evaluation 8K2 with normally open safety edge contact**

**Typ 3: Optical safety edge (Fraba Brand)**



### **Important note!**

When connecting a safety edge, take account of DIN EN 12978 for Industrial, commercial and garage doors and gates - Safety devices for power operated doors - Requirements and Test methods.

## **Mounting the spiral cable**

A bush is provided on both sides of the control box for mounting the spiral cable.

Push the plugs through into the enclosure until there is sufficient cable to allow the (2 and 3 pole) plugs to be connected to the board. The plug with two cores must be connected to the passdoor or slack wire switch terminals. The three core plug must be connected to the safety edge terminal.

The control panel TS 970 recognizes on first installation the safety edge system being used.

**If passdoor / slack wire switch contact exists, remove bridge at terminal ST and ST+ in the terminal box. The plug at terminal X2 must be removed.**



### **Important note!**

When using a safety edge system the automatic pre-limit adjustment must be checked. When the safety edge is activated the door should stop and reverse to the open position.

# SAFETY DEVICES

---

## Typ 1: Resistance evaluation 1K2 with normally closed safety edge contact

This evaluation system is made for pressure-wave switches (N/C) within an end-of-line resistor of 1K2 +/- 5% 0,25W.

A pressure wave is generated by compressing the rubber profile, which is conducted to the pressure-wave switch through the plastic hose. The system should be tested in the CLOSE position. The pre-limit would be set automatically and activate the "Testing function".

When the shutter runs over the pre-limit door position, a timer of two seconds starts to countdown at once. If a pressure wave activates the pressure switch in this time the TS 970 recognizes the function of the safety edge. If the pressure switch has not been activated, the control goes into fault mode and the system works only in DEAD MAN function in downwards direction. Fault information F 2.8 would be displayed.

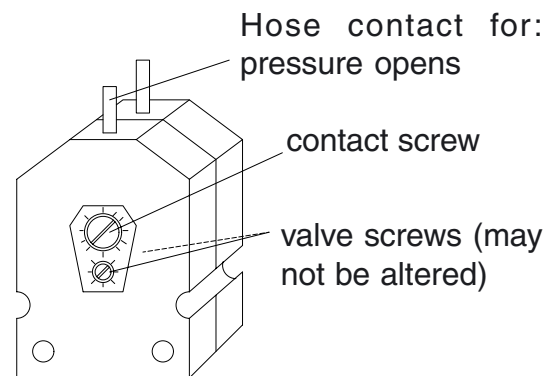
### Pressure-wave switch - function

The contact between the contact screw and diaphragm is opened (opening contact). The pressure-wave switch is set to a release pressure of approx. 1,5 mbar.

The valve screws are set to a throughput of 110 ml/min with a static admission pressure of 5 mbar. This warrants that a maximum temperature increase of 30° is compensated for in 20 minutes.

The setting of the valve screws may not be altered. Should the release pressure be insufficient (pressure wave too insensitive), the contact screw may be turned counterclockwise to the left by 1-2 graduation marks. The switch's sensitivity is thus increased.

In case of excessive sensitivity, the contact screw is set clockwise by 1-2 graduation marks (decreased sensitivity).



**Pressure-wave switch**

## Typ 2: Resistance evaluation 8K2 with normally open safety edge contact

This evaluation system is made for electrical safety edges within an end-of-line resistor of 8K2 +/- 5% 0,25W. The resistor must be connected in series with the switch in the safety edge.

## Typ 3: Optical safety edge (Fraba Brand)

The principle of operation is as a one way light barrier. By activating the safety edge, the photo-beam will be interrupted.

# SAFETY DEVICES

---

## Function of the safety edge system

With **Menu 2.1** the function of the safety edge system can be chosen.

Function	Reaction following the activation
Active safety edge	stop
De-activated safety edge	no reaction, door moves until final limit close only for folding doors
Active safety edge+ downward automatic floor adjustment	stops and automatically re-adjusts the final limit with the next movement

The function 'Auto ground adjustment' is used for doors with a cable e.g. Sectional doors or vertical lift-gate. An automatic correction of slackness or change of ground height up to 2-5 cm is possible. The slack wire switch is still recognised.



### Important note!

To use the automatic floor adjustment, the safety edge must be operated in the door closed position by an auxiliary puffer switch.



### Important !


The automatic ground adjustment works only when the following safety edge systems are connected:

**Typ 2:** electrical system resistance evaluation 8K2 or **Typ 3:** optical safety edge (FRABA Brand)



### Important note!

When the safety edge has been operated twice the automatic closing feature will be interrupted and fault F2.2 will be displayed.

To reset the fault press the internal pushbutton  so that the door travels down until the final limit is reached.

## Emergency stop **X3**

These terminals are to connect an emergency stop button according to DIN EN 418. Alternatively the terminals can be used to connect a safety device against entrapment (e.g. self-testing light barrier).

# FUNCTION DESCRIPTION

---

## Key switch (latching) interrupt automatic closing **X4**

The automatic closing time can be interrupted with a normally open switch (latching)

## Internal pushbutton / Three position switch / Key switch **X5**

### Internal and external pushbutton

Internal and external pushbutton working separately from each other. Pushing at the same time, the internal pushbutton has priority.



#### **Important note!**

Dead man mode UP and DOWN with internal pushbutton.

Dead man mode DOWN with external pushbutton. (**Menu 0.1 Adjustment 0.4**)

**In Dead man mode the user shall be in full view of the door throughout its travel.**

## Automatic closing

**Menu 2.3** the timer works between 1 - 240 sec. If the automatic closing is active, the shutter will close, from each limit position after the pre-adjusted time.



#### **Important note!**

The timer can be interrupted by pressing the internal pushbutton stop when the shutter has reached a limit position. With a new command UP / DOWN the timer is re-set.

## Automatic closing interruption

**Menu 2.4** can be used if the timer operation is required after interrupting and re-making the photo-beam. The door closes after 3 seconds.



# FUNCTION DESCRIPTION

---

## Photo-beam for Closing Direction X6

One external photo-beam (thro' beam or reflective photo beam) can be connected to the control. A 24V DC supply for the photo-beam is available.



### Important note!

The load on the 24 V DC power supply may not exceed 150 mA.

The light barrier is used in a normally closed operating mode.

In case the light barrier is activated or it malfunctions the contact will open and cause following reactions.

Door Position	Reaction when Photo-beam is Interrupted
Door closed	no reaction
Door opening	no reaction
End position open *) without timer active	no reaction
End position open *) with timer active	resets open timer for automatic closing mode
End position open *) with timer active and time interruption	With the photo-beam connected the shutter closes after 3 sec. when the beam has been interrupted and remade The time delay is cancelled and re made.
Closing Door	Stops and re-opens fully *)

\*) or to the intermediate stop position when the key switch is in the on position

## Interruption of photo beam function

Disabling of the photo beam re-open function, **Menu 3.2.**

Prevents a **the door re-opening** during the DOWNWARD movement when the photo beam is switched unintentionally, e. g. by the spiral cable

To learn the switching position, the re-open function has to be interrupted for 2 full opening and closing movements automatically after programming this function.

When the photo beam has been switched twice consecutively the switching position will be memorised.

Thereafter the door is ready to change back to normal function.

# FUNCTION DESCRIPTION

---

## Ceiling pull switch / Radio control **X7**

It is possible to connect a ceiling pull switch or a radio receiver.

The radio receiver's switching contact must be potential free. A small receiver can be fitted into the upper part of the housing under the cable entry.

With each command (contact) the shutter operates in the following sequence:

Shutter position	Shutter operation
Shutter closed	Shutter moves to fully open or intermediate position
Shutter moving upwards	No reaction
Shutter open	Shutter moves to fully closed position
Shutter intermediate position open	Shutter moves to fully closed position
Shutter moving downwards	Shutter will STOP and moves BACK UP to final open Position*)
See commands page 16 Control menu 2.6 Adjustment 0.2 step by step function	

\*) or to the intermediate stop position when the key switch is in the on position

## Key switch – intermediate stop **X8**

Intermediate stop can be activated / de-activated by connecting a key switch (latching ON-OFF). The intermediate shutter position „PART OPEN“ is only in effect in the upwards direction and is the new open position.

In **Menu 1.6** the position can be adjusted. This is the new final position.

By turning the key switch to the OFF position, the shutter works in standard mode.

## Potential free changeover contact **X9**

In **Menu 2.5** this contact is able to work for several functions.



### Important note!

It is only possible to work with one adjusted function.

When activating the switching point the shutter must be moved to the point. **Menu 1.7** must be activated.

After a command, the lamp starts flashing for 3 seconds as pre-warning time before the shutter moves and continues until the shutter reaches the end position. When the movement is interrupted in between the final positions, the flashing mode continues.

# FUNCTION DESCRIPTION

---

## Overrun correction

The stopping position of the door can be influenced by various factors e.g. temperature, cable extension etc.

To always have the same door stopping position the overrun correction can be activated. Using **Menu 2.2** the overrun correction can be switched ON or OFF



### Important!

Great variations of temperature during a time when the door is not in use, could cause a position variation of about 1cm. This will be reset automatically after reaching the final close limit.

## Door overload monitor

The door overload monitor recognises that a person is being lifted by the door (hanging on a handle, etc.) and could be adjusted within **Menu 3.1** with a possibility of two steps of sensitivity. Adjustment 0.1 coarse = insensitive reaction and adjustment 0.2 fine = sensitive reaction



### Important!

**After programming the force monitoring the door must perform a complete opening and closing cycle in automatic mode, during which the system reads the increments to calculate the way.**



### Important Note!

To have a trouble-free service the following points must be checked:

- The door must be correctly balanced
- The cable drum diameter should not be less than 160mm

Environmental influences e.g. temperature or wind load can cause the overload monitor to be activated.

The overload monitor is a self-learning system, and checks the system from 5 cm up to ca. 2,0 m, slow-occurring changes e.g. spring tension will be automatically recognised and equalized.



### Important Note!

The overload monitor does not take place against other safety devices e.g. (safety against entrapment)

When an overload is detected the door works only Dead man Mode in the UP and DOWN direction.

The control unit automatically resets to impulse control when a final limit position has been reached.

# FUNCTION DESCRIPTION

---

## Maintenance cycle counter

Free adjustable maintenance cycle counter **Menu 8.5** makes it possible to pre-adjust a max. No of cycles until a maintenance is agreed.

The no of cycles can be adjusted from 1.000 up to 99.000; the adjustment is possible in steps of 1.000 cycles.

Three different reactions can be chosen if the point of pre- adjusted maintenance cycles has been reached, see **Menu 8.6**

Whenever the final open limit has been contacted the pre-adjusted number will be reduced with 1 until 0 is reached.

When maintenance was done the cycle counter could be re-adjusted to a new maintenance period and count down starts again.

## Short circuit / overload monitor

The TS 970 control panel delivers 2 supplies for external devices.

230V AC; max. 1A















24V DC; max. 150mA

If the 24V DC supply is short-circuited or overloaded, the red point in the display goes out.













If the display is out, fuse F1 must be checked.

# OPERATING STATUS DISPLAY





The control TS970 can display up to three different status conditions one after another. Each status is displayed with a letter and a number. The letter and the number are flashing alternately, thereby the control differentiates between a FAULT = **F** and a command = **E**.

Report	Description	Measure to solve the problem
	Pass door contact open	Check the proper operation of pass door contact, or whether the supply cable is broken
	Emergency operator or motor-winding thermal protection operated	Check emergency operator or whether the drive unit is overloaded.
	Emergency stop activated	Check the emergency stop is activated, or whether the supply cable is broken
	Failure pass door contact X 2.1- X 2.2 or control voltage circuit less than 24V	Check pass door circuit's transition resistance and whether pass door switch works; verify the voltage is OK at 24V terminal to GND
	Failure input pass door X 2.1- X 2.2	For reset switch control panel OFF-ON
	Safety edge not recognised	Check the safety edge is connected correctly or the wrong type has been selected in the program
	Light barrier activated	Check the light barrier has been fitted properly, or whether the connecting cable is broken
	Safety edge operated in two consecutive cycles	Check if there is an obstacle in the shutter area, or the connecting cable is broken or there is a short circuit in the cable
	Safety edge 8K2 activated	Check the safety edge is activated or there is a short circuit in the connecting cable
	Safety edge 8k2 defect	Check safety edge and connecting cable are not broken
	Safety edge 1K2 activated	Check safety edge and connecting cable are not broken
	Safety edge 1k2 defect	Check safety edge and connecting cable do not have a short circuit
	Safety edge 1k2 pneumatic system TESTING negative	Check the proper safety edge function and that testing in the lower door position is correct
	Optical safety edge activated or defect	Check the proper safety edge function or whether the supply cable is interrupted

# OPERATING STATUS DISPLAY

Report	Description	Measure to solve the problem
	Limits not adjusted	Adjust limits
	Safety open limit operated	Turn mains supply OFF and move the shutter downwards - with the manual operator- until the safety limit is free or the open limit should be re-adjusted.
	Safety close limit operated	Turn mains supply OFF and move the shutter upwards - with the manual operator- until the safety limit is free or the close limit should be re-adjusted.
	Door load monitor has activated	Check the door mechanism for tightness
	ROM - Fault	Reset by switching OFF or change the control
	Internal fault report	Reset by switching OFF or change the control
	RAM - Fault	Reset by switching OFF or change the control
	Internal control fault	Reset by switching OFF or change the control
	DES – no response	Check electronic limit DES connection. Reset by switching OFF or change the control or the electronic limit.
	Drive unit does not work	Check the shutter mechanics. Check the limit shaft for function (turning) Check phase rotation.
	Phase rotation failure	Check main supply phase rotation turns right
	Closing rpm over speeded at DU Speed Changer	Switch supply ON-OFF If again and again, replace drive unit

# OPERATING STATUS DISPLAY

Report	Command description
	open command being given
	stop command being given
	close command being given
	If the normally displayed red spot is out = Short circuit or overload on the 24V supply

## TECHNICAL DATA

Housing Dimensions	160mm x 240mm x 90mm (W x H x D)
Mounting	vertical
ELEKTROMATEN® Supply	Three-phase 3 x 230 / 400V AC $\pm$ 5%, 50...60Hz Single-phase 1 x 230V $\pm$ 5%, 50...60Hz Power max. at 3 x 400V AC, max. 3kW
Control supply via L1,L2	400V AC or 230V AC + - 10%, 50-...60Hz, voltage changing with bridge to 3- pole terminal, safety fuse F1 (1A t)
External supply fuse	10A delayed
Permitted Load	ca. 15 VA (without motor and ext. 230V)
External supply 1	230V via L1 and N, safety fuse F1 (1A t)
External supply 2	24V DC uncontrolled, max. Load 150mA, Protected via electronic fuse
Inputs	24V DC / typ. 10mA signal length must be more than 100ms
Relay output	If inductive loads are to be switched (e.g. other relays) those have to be protected with free-wheeling Diodes contact load at 230V max. 1A
Temperature	Working: +0.... +40°C Storage: +0....+50°C
Humidity:	To 93% not condensing
Vibration:	Vibration free mounting, e.g. on flat built wall
Protection class	IP54 (CEE Plug), IP65 available



# DECLARATION OF INCORPORATION

according to

**EC guidelines 98/37/EC**

**Low voltage guideline 73/23/EEC**

**with amendments**

**Electromagnetic compatibility 89/336/EEC**

**with amendments**



**ELEKTROMATEN®**

**GfA - Gesellschaft für Antriebstechnik**  
Dr.-Ing. Hammann GmbH & Co. KG  
Wiesenstr. 81

**40 549 Düsseldorf (Heerdt)**

We, the

**GfA - Gesellschaft für Antriebstechnik**

**Wiesenstr. 81, 40549 Düsseldorf (Heerdt), Germany**

hereby declare that the following products conform with the  
above EC guidelines and are only intended for installation in door equipment.

Product description: **Door Control Panel TS 970**

Harmonised norms applied

**- DIN EN 12543**

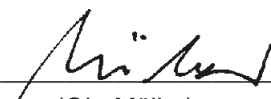
Safety in use of power operated doors  
- Requirements

**- DIN EN 12978**

Industrial, commercial and garage doors and gates -  
Safety devices for power operated doors  
- Requirements and Test methods

The machinery to which this Declaration of Incorporation relates must not be put in to service until the relevant machinery into which is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Düsseldorf, 23. 01. 2004

  
(GL, Müller)

  
(QMS, U. Hohns)

# FUNCTION OVERVIEW

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- **Control panel for ELEKTROMATEN®** up to. 3 kW at 400V / 3~ with electronic limit **DES** designed for only low-level adjustment
- **7- Segment led display showing**
  - Programming the control panel
  - Displays Command - / Info- / Fault
- **Mains supply**
  - 400V / 3~ with and without Neutral
  - 230V / 3~
  - 230V / 1~ (for single-phase motors)
- **Door operating modes**
  - Dead-man open- and close
  - Self-hold open- and dead-man mode close (without safety edge)
  - Automatic open- and close (with safety edge connected)
- **Integrated safety edge systems**
  - 8K2 normally open contact
  - 1K2 normally close contact
  - optical safety edge system (System Fraba)
- **automatic close feature**
  - free programmable from 1 up to max. 240 Sec.
  - on interrupting and re-making light barrier closing after 3 sec..
  - Can be interrupted by a separate switch
- **supply for external devices**
  - 230V (at 400V / 3~ with N), up to 1A load
  - 24V DC, up to 150mA load
- **Plug for 5 pole motor connector 6 pole for electronic limit DES**
- **Plug for spiral cable (safety edge and pass-door contact)**
- **integrated internal pushbutton OPEN / STOP / CLOSE**
- **Additional terminals for different control equipment**
  - Emergency stop ( LATCHING)
  - additional safety stops
  - external three push button OPEN / STOP / CLOSE
  - Light barrier activated Stop and Reverse function, time reset, time interruption 3 sec.
  - One channel - impulse functions e. g. Ceiling pull switch for OPEN / CLOSE / STOP
    - sequencing or radio control
  - Key switch ( latching) for intermediate Stop
  - 1x potential free relay output (NC / NO), output signal from aux. limit
    - If a signal lamp is in use, the potential free limit is not available